

United States Patent Application  
of  
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for  
RANDOMLY CONTROLLED ROULETTE GAME OPERATION

Claiming priority of my copending United States Patent Application S.N. 10/693,741 filed October 24, 2003; and of my three United States Provisional Applications Serial No. 60\484990 filed July 3, 2003; Serial No. 60\495641 filed August 15, 2003; and Serial No. 60\502456 filed September 11, 2003.

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**PRIORITY CLAIM**

(0001). I claim priority of my copending United States Patent Application S.N. 10/693,741 filed October 24, 2003; and of my three United States Provisional Applications Serial No. 60\484990 filed July 3, 2003; Serial No. 60\495641 filed August 15, 2003; and Serial No. 60\502456 filed September 11, 2003.

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**FIELD OF THE INVENTION**

(0002). This invention relates to improvements in gaming devices, and particularly to roulette table games, or video simulations thereof, or in coin operated gaming devices or in internet gaming.

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**BACKGROUND OF THE INVENTION**

(0003). In the game of roulette, which is played at many gaming houses in the United States and elsewhere, a dealer employed by the gaming house releases a ball which then travels around the periphery of a rotating wheel having circumferentially arranged stopping places, until the ball finally stops at a particular stop. The stopping place of the ball, and a number associated with that stopping place, determines whether particular players have won or lost on their bets, and also whether the house has won or lost.

(0004). Although it is perhaps a groundless concern, some

1 players worry that the dealer, because of greater familiarity with  
2 the apparatus and its mode of operation, may be able to cause the  
3 ball to stop at a location favorable to the house but which will  
4 cause the players to lose.

5 (0005). Many players may therefore wish for a procedure that  
6 would ensure that the dealer cannot and has not "rigged" the play.

#### 7 SUMMARY OF THE INVENTION

8 (0006). According to my invention I have provided a method  
9 and apparatus for randomly controlling an actual or simulated  
10 roulette game, which ensures that a dealer or game management  
11 system cannot and has not "rigged" the play. Furthermore, my novel  
12 method not only operates the game in a random fashion, but also  
13 provides confirmation of that random operation to the player.

14 (0007). According to the presently preferred embodiment of my  
15 invention a Start Game signal is generated, and a Launch Signal  
16 causes an actual or simulated ball to be launched, in such a way  
17 that a dealer who may be in charge of the game has no direct  
18 physical contact with the ball during either its launch or its  
19 subsequent travel, and hence has no control over where the ball  
20 might stop.

21 (0008). According to the presently preferred embodiment of my  
22 invention a Start Game signal is remotely generated either by a  
23 dealer, by a Game Management System, or by a customer or player.  
24 The operation of the actual or simulated game then proceeds in a

1 manner that is entirely random in one or more respects.

2 (0009). According to the presently preferred form of my novel  
3 method I utilize an electronically generated random time delay  
4 after the Start Signal and before the Launch Signal is generated.  
5 An isolated manually actuatable activation means generates the Start  
6 Game signal which then energizes an electronic random time delay  
7 device. The conclusion of the random time delay causes the Launch  
8 Signal to be generated. A mechanical launch mechanism upon  
9 receiving the Launch Signal is capable of launching the ball along  
10 a desired path about the wheel periphery. A person who actuates  
11 the isolated manually actuatable activation means, therefore, is  
12 unable to predict or control either the exact time the ball will be  
13 launched or its ultimate stopping place.

14 (0010). According to my invention any one of a number of  
15 different means may be used for communicating a Start Signal from  
16 the isolated manually actuatable activation means to the random time  
17 delay device, including a hard-wired circuit, a radio transmitter,  
18 an infrared remote control, or the like.

19 (0011). Still further in accordance with the presently  
20 preferred form of my invention, the launching of the ball may be  
21 propelled by an electromagnetic action, by a release of air  
22 pressure, by spring action, or by other suitable means.

23 (0012). Further in accordance with the preferred form of my  
24 invention I also provide an apparatus which may be retrofitted into  
25 an existing roulette game table and which may then be used to carry

1 out the purposes of my invention.

2 (0013). Also according to my invention, any one of various  
3 other kinds of random control may be applied to an actual or  
4 simulated game. My invention contemplates any kind of method or  
5 apparatus that may be used by a gaming establishment will meet the  
6 requirements of the relevant Gaming Commission or its equivalent.

7 (0014). In an actual game there may be an adjustment or  
8 variation in the one-time energy level imparted to the launch  
9 mechanism for launching the ball, or in the energy level that is  
10 imparted in either a steady-state or variable amount to an electric  
11 motor that drives the rotation of the wheel.

12 (0015). In a simulated or virtual game, the ball may have a  
13 simulated movement the speed of which may be subject to an initial  
14 selection, or which is subject to continuing adjustment, or which  
15 is subject to braking or deceleration at a selected level; or the  
16 movement of the ball may be stopped at the end of a predetermined  
17 discrete time interval.

18 (0016). According to my invention, in a simulated or virtual  
19 game shown in video, the operation may be either the same as it  
20 would be in a real physical embodiment of the game, or it may be  
21 different as suggested above. A simulated or virtual game may be  
22 coin-operated by the player or customer.

23 (0017). Still another aspect of my invention is conducting a  
24 game via the internet. The techniques are the same as for a video  
25 or virtual game. In addition, appropriate encryption techniques

1 are used to keep communications confidential and prevent cheating.

## 2 **DRAWING SUMMARY**

3 (0018). Figure 1 is a schematic representation of the  
4 presently preferred apparatus in accordance with the invention;

5 (0019). Figure 2(a) is a schematic diagram of a random time  
6 delay circuit and an associated visible time delay readout in  
7 accordance with the invention;

8 (0020). Figure 2(b) is a wave diagram showing the timing  
9 relationships in the operation of the random time delay circuit of  
10 Fig. 2 (a);

11 (0021). Figures 3a, 3b, and 3c illustrate in schematic form  
12 various types of launching mechanisms that may be utilized with my  
13 invention;

14 (0022). Figure 4 illustrates a roulette game table retrofit  
15 apparatus in accordance with my invention, in which an opening is  
16 made in the wooden housing for the roulette wheel, and the launch  
17 mechanism is fitted into that opening;

18 (0023). Figure 5 schematically illustrates a system for  
19 varying the electric motor speed to drive the wheel rotation;

20 (0024). Figure 6 illustrates a physical arrangement of the  
21 motor drive according to Figure 5;

22 (0025). Figure 7 schematically shows an electronic system for  
23 controlling motor drive speed in accordance with Figs. 5 and 6;

24 (0026). Figure 8 shows a software system for operating a

1 virtual or simulated game in which wheel rotation and operating  
2 results are electronically displayed; and

3 (0027). Figure 9 illustrates an encryption system for  
4 communicating bets via internet to a remotely located gaming  
5 establishment.

#### 6 DESCRIPTION OF PREFERRED EMBODIMENT

##### 7 (Figures 1-4)

8 (0028). Referring now to the drawings, Fig. 1 shows a  
9 roulette wheel 10 onto which a ball 11 is to be launched. An  
10 energizable launch device or mechanism 12 is available to provide  
11 the actual launching of the ball. A remote transmitter 14 is  
12 controlled by a push button 15. When the button 15 is pushed the  
13 transmitter generates a Start Game signal 16 that is then  
14 transmitted to an electronic random time delay circuit 17. The  
15 transmission of the Start Signal 16 is represented in Fig. 1 by a  
16 dotted line and arrow, indicative of the fact that any of several  
17 different means may be utilized for communicating a Start Game  
18 signal to the electronic random time delay circuit 17. Also  
19 associated with the time delay circuit 17 is a time delay readout  
20 18 which visibly indicate the actual amount of time that transpires  
21 after the start button 15 is pressed and before a Launch Signal is  
22 generated to energize the launch mechanism 12.

23 (0029). In accordance with the invention a random time period  
24 is generated by electronic circuitry as shown in Fig. 2. Referring

1 now to Fig. 2(a) of the drawings, the principal operative circuit  
2 elements that create a random time delay period are a square-wave  
3 generator 20, a latching flip-flop 25, and a D flip-flop 30. The  
4 operation of the D flip-flop 30 is of unique importance and will be  
5 described first.

6 (0030). D flip-flop 30 has an input 31 which receives an  
7 Enable signal on output 27 from the latch 25, and an input 32 which  
8 receives the output signal of the square-wave generator 20. It  
9 also has a primary output terminal 33 from which a Launch Signal 40  
10 is to be generated. The operation of the D flip-flop is such that  
11 an output signal on terminal 33 is only possible **after** the voltage  
12 signal on input 32 has raised from a low to a high voltage level.  
13 In other words, if the input signal received on terminal 32 from  
14 square-wave generator 20 is already high at the time the Enable  
15 signal starts, then nothing else will happen; flip-flop 30 will not  
16 then produce an output until its square-wave input on terminal 32  
17 goes down to its lower voltage level and then later rises to the  
18 higher level.

19 (0031). Fig. 2 (b) shows the time relationships resulting  
20 from the circuitry of Fig. 2 (a). The Start Game signal applied to  
21 terminal 26 of latching flip-flop 25 causes the Enable signal on  
22 terminal 27 to rise to its higher level. That time is designated  
23 as  $t_1$ . Assuming that the output signal on output terminal 32 of  
24 square wave generator 30 is still at a low level, a random time



1 delay period extending from t1 to t2 will now take place. The time  
2 when the output terminal 32 of generator 30 rises to its high level  
3 is designated as time t2. The co-existence of the continuing  
4 Enable signal on line 27 at its high level and the change of  
5 terminal 32 to a high level then causes the D flip-flop 30 to  
6 generate a Launch Signal 40 on its output terminal 33.

7 (0032). The time interval between time t1 and time t2 is a  
8 randomly generated time interval. It will be understood that the  
9 operation of square wave generator 20 is not synchronized with  
10 anything else in the circuitry. The square wave generator may,  
11 for example, be a free-running multivibrator with either equal or  
12 unequal time periods for its two output states. Alternatively, a  
13 high-frequency oscillator could be utilized with a frequency  
14 divider circuit to create a low frequency square wave output on  
15 terminal 32. By selecting a desired time period for the low  
16 voltage level output of generator 20 it is possible to generate  
17 random time delays that may be either a very small fraction of a  
18 second, or as much as several seconds, as may be desired. The  
19 random time delay interval will never exceed the duration of the  
20 low voltage level of the low frequency square wave output on  
21 terminal 32.

22 (0033). Clock Signal generator 50 is an independent circuit.  
23 The clock frequency is selected to be at least many times the  
24 frequency of the square wave output signal of generator 20. When  
25 the signal received on terminal 32 goes from low to high, there may

1 then have been a rather large number of clock pulses which the  
2 counter 45 would have counted before the output signal of the  
3 generator 20 goes low again. The time delay count displayed on the  
4 readout device 18 may be calibrated in any desired units, since  
5 players or customers for the game will be primarily interested in  
6 seeing that the time delays are random and not pre-programmed.

7 (0034). Latching flip-flop 25 performs the function of  
8 receiving and storing the Start Game signal 16 generated from the  
9 remote transmitter 14, shown in Fig. 1. It is only while the  
10 output 27 of flip-flop 25 is at its high voltage level that the D  
11 flip-flop 30 can generate a Launch Signal 40 on terminal 33. Thus,  
12 D flip-flop circuit 30 acts like an "and" circuit in which the two  
13 inputs required to be present concurrently are (1) an Enable signal  
14 that has been received from output terminal 27 of latch 25 and  
15 continues to exist; and (2) the output of square wave generator 20  
16 on terminal 32 having risen from its low to its high level and  
17 continuing to exist at that level.

18 (0035). During the time period that these two conditions exist  
19 concurrently, the counter 45 will count pulses from the clock  
20 generator 50 and provide a corresponding output to display 18.  
21 When the output voltage of the D flip-flop returns to its lower  
22 level the count will stop, under control of complementary output  
23 line 34 of D flip-flop 30.

24 (0036). Readout from display 18 is available from the time  
25 that the counting starts until the high output voltage level from

1 D flip-flop 30 ends, at which time complementary output terminal 34  
2 of the flip-flop generates a signal indicating that the count  
3 should be stopped. This signal on terminal 34 is combined through  
4 an "and" gate 57 with the output of latch 25, to instruct counter  
5 circuit 45 to stop counting. The accumulated time count will then  
6 remain visible for a period of time. Thus according to my  
7 invention I have provided a method and apparatus for randomly  
8 controlling an actual or simulated roulette game, which ensures  
9 that a dealer or game management system cannot and has not "rigged"  
10 the play. Furthermore, my novel method not only operates the game  
11 in a random fashion, but also provides information to the player so  
12 that he or she will be positively assured of that.

13 (0037). When the ball has stopped, and its stoppage has been  
14 electronically detected, one of the inputs required for "and" gate  
15 60 is satisfied. The other requirement is a Reset Game signal  
16 on input line 61. When these two inputs co-exist, gate 60 then  
17 produces a negative output pulse acting as a reset signal which is  
18 delivered to each of three different places to return the circuitry  
19 to initial starting condition. One of those three destinations is  
20 latch 25; another is D flip-flop 30; and the third is counter 45.

21 (0038). It is desirable for the random time count displayed in  
22 device 18 to remain visible for some period of time after the ball  
23 has stopped, in order to allow the players or customers adequate  
24 time to see and understand the random time delay count. This  
25 provides assurance to the customer of the randomness of operation.

1           (0039). With the circuitry as presently illustrated it is  
2 necessary for the dealer (or someone else) to send a Game Reset  
3 signal on input line 61; then, it is also necessary to push the  
4 remote button 15 in order to actually start a new game by again  
5 launching the ball. It would be possible to combine start button  
6 15 and reset game line 61 into a single control, but that would not  
7 be the preferred approach.

8           (0040). Referring now to Figs. 3a, 3b, and 3c, it will be  
9 seen that driving power to launch the ball 11 may be achieved by  
10 any of three different methods. As shown in Fig. 3a a one-shot  
11 multivibrator 70 delivers a pulse of energy to a spring-loaded  
12 solenoid 71, which in turn drives a plunger 72 to launch the ball  
13 11. As shown in Fig. 3b a source 75 of pressurized air may be  
14 selectively admitted through a valve 76 to drive the launch plunger  
15 72. Fig. 3c indicates that a loaded spring 95 may be released to  
16 drive a ball flipper 97. I presently prefer the electromechanical  
17 action as provided by the solenoid 71. Although any one of these  
18 launch mechanisms may be utilized in accordance with my novel  
19 method, there are other known mechanisms that could, if desired, be  
20 used for that purpose.

21           (0041). Referring now to Fig. 4, there is shown a retrofit  
22 apparatus in accordance with the presently preferred form of my  
23 invention that may be used to modify an existing roulette table to  
24 accomplish the purposes of my invention. A cable 90 receives the  
25 launch signal 40 from output 33 of D flip-flop 30. Housing 13 for

1 the roulette wheel 10 has an opening 80 for receiving the Launch  
2 device 12. Launch device 12 includes the one-shot multivibrator 70  
3 which is located in a relatively large rearward part of opening 80.  
4 A smaller forward portion 84 of opening 80 extends forwardly. A  
5 plunger 72 is reciprocably movable within forward housing 84 for  
6 launching the ball 11. The multivibrator 70 delivers a pulse of  
7 energy to a spring-loaded solenoid 71, also contained within  
8 housing portion 82, and which in turn drives the plunger 72 to  
9 launch the ball.

10 (0042). **Method of Operation.** Before a game is started it is  
11 necessary for the dealer to place the ball in the extreme forward  
12 end of opening 80 where it may be engaged by plunger 72. Then a  
13 Reset Game signal is applied to line 61. The apparatus is now  
14 ready to start a game. The next step is for the dealer -- or a  
15 player or customer -- to push the remote button 15, causing a Start  
16 Signal to be generated. This causes flip-flop 25 to latch in the  
17 Enable state, at time t1. When the output wave of square-wave  
18 generator 20 again rises to its high level, at time t2, a Launch  
19 Signal 40 will be generated and plunger 72 will launch the ball.  
20 At the same time, the counter 45 will have accumulated a count  
21 indicative of the random time delay that has transpired between the  
22 pushing of button 15 and the application of the Launch Signal to  
23 energize launch mechanism 12. A count that represents the random  
24 time delay is then visibly displayed in the display device 18. The

1 dealer may then reposition the ball in preparation for another  
2 game. The time delay display will remain until another Game Reset  
3 signal is applied to line 61.

#### 4 **TABLE GAME WITH RANDOM WHEEL SPEED**

5 **(Figures 5 through 7)**

6 (0043). Figures 5 through 7 show a modified form of the table  
7 game in accordance with my invention. Figure 5 schematically  
8 illustrates a system for varying the electric motor speed to drive  
9 the wheel rotation. Figures 5 and 6 show an apparatus in which the  
10 wheel includes a fixed outer part 104 and a rotatable inner part  
11 106. As indicated at the top of Figure 5, one momentary switch  
12 button 100 is pushed to select the energy level to be applied to  
13 the wheel, and then a second button 102 is pushed to start  
14 launching of the ball. Figure 7 is a schematic drawing of an  
15 electronic circuit including a counter CE, enabled by the first  
16 push button 100, for selecting the energy level for motor  
17 energization and hence the motor drive speed.

#### 18 **SIMULATED OR VIRTUAL GAME**

19 **(Figure 8)**

20 (0044). For Internet gaming or gaming conducted by other  
21 remote electronic communication it may be desirable to display a  
22 simulated movement of the wheel and ball on a screen that is being  
23 viewed by the player or customer. On the other hand, the player  
24 may be interested only in the final numbers that determine win or

1     loss.

2           (0045). Figure 8 illustrates a software system for operating  
3     a virtual or simulated game in which the player is provided with  
4     positive assurance that the operation has been random. The wheel  
5     rotation and ball movement are electronically simulated, and an  
6     electronic display of randomly selected numbers which control the  
7     operation provides proof that the operating results are randomly  
8     controlled.

#### 9                   INTERNET GAMING WITH PLAYER PROTECTION ENCRYPTION

#### 10                   (Figure 9)

11           (0046). In Internet gaming encrypted communication is very  
12     desirable, if not absolutely essential. Figure 9 illustrates an  
13     encryption system for communicating bets via internet to a remotely  
14     located gaming establishment. The gaming house (or its computer)  
15     initially selects one-half of an encryption key and sends it to the  
16     player. The player then selects a second half for the encryption,  
17     but stores it in secure storage under his control pending outcome  
18     of the game. After the player has made a bet, the game has been  
19     played, and a winning number such as 17 has been determined, the  
20     player then sends the second half of his encryption code to the  
21     gaming house in order to collect his winning.

#### 22                   OTHER ALTERNATIVES

23           (0047). According to my invention, any one of various kinds of  
24     random control may be applied to an actual game. In an actual game

1   there may be an adjustment or variation in a one-time energy level  
2   imparted to the launch mechanism for launching the ball, or in an  
3   energy level that is imparted in steady-state fashion, or in an  
4   energy level that is imparted in a variable amount to an electric  
5   motor that in turn drives the rotation of the wheel. In a virtual  
6   or simulated game there may be any number of parameters that are  
7   randomly selected and controlled, and displayed to the customer as  
8   proof of the randomness of operation.

9           (0048). The presently preferred embodiment of my invention  
10   has been disclosed in detail in order to comply with requirements  
11   of the patent laws. It will be understood, however, that other  
12   modifications and variations will be understood by persons who are  
13   skilled in the art, and that the scope of my invention is to be  
14   judged only in accordance with the appended claims.

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16           WHAT I CLAIM IS:  
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